October 23, 1952

Dear Jacques and Mel:

Some time ago you expressed an interested to apply your immunochemical techniques to the Lac mutants at several loci of E. coli K-12. At the time, I was reticent about sending all of them out for two reasons: that further genetic work needed to be done with some of them, and that we anticipated carrying out similar studies ourselves in correlation with our genetic work. For various reasons, partly developments in other areas, it now seems unlikely that we will be able to do the immunological work with lactase in the immediate future. If you are still interested, I will be happy to send you the mutants for this purpose.

Your recent findings on the obscurities of the relationship between Pz and Gz are most interesting. It would be of obvious value to determine whether any of the Lac- mutants are deficient in the formation of Pz as well as of PZ. If none of them show such a correlation, it would appear unlikely thatbthere is any direct relationship, There is always the possibility, of course, that we have not yet uncovered those particular mutations whose interference with the adaptive machinery involves a sufficiently early stage. I do not know whether this is more likely to hold for pleiotropic mutants (e.g. Lac_3-)whose block is incomplete, or monotropic ones which show very little "leakage" (viz. Lac_2- and Lac_4-). I will assume that you have maintained Lac_1- and Cst+ cultures previously sent you— it would be a convenience if you could send me a brief list of the K-12 cultures you have kept.

Is it likely that Gz is another fermentation enzyme? If so, it might be appropriate to study this by the circuitous approach of looking for Gz in other fermentation mutants. We have a fairly large collection of these, whose genetics has not been studied in very much detail. If you have any fairly explicit hunches, however, perhaps it would be worth digging into this material. It is rather apparent that we have reached identical conclusions on the relationships of genes to enzymes in this adaptive system. Please do not misconstrue my twitting you, Jacques, by suggesting that this is an advance from your previous position (Growth, 1947). Some of your readers may not realize this unless it is explicitly pointed out— especially those who prefer to retain an oversimplified view of it.

Under separate cover (possibly addressed to Wollman) Esther has sent a batch of reprints of her work on the alleles at Lac_1. There is a lot more to done along this line or purely genetic study, but which can be enriched by collateral physiological work. One of the most astounding findings from your work, to my mind, are the cross-reactions of Gz from different bacteria, notwithstanding the difference between the serological and enzymatic receptors. We are still enmeshed in the somatic antigens in our studies of different fertile lines, but when these get to be cleared up we hope eventually to turn to the more interesting metabolic proteins.

Sincerely